Name: Date:

Exam: Function Reflections (Solution version 620)

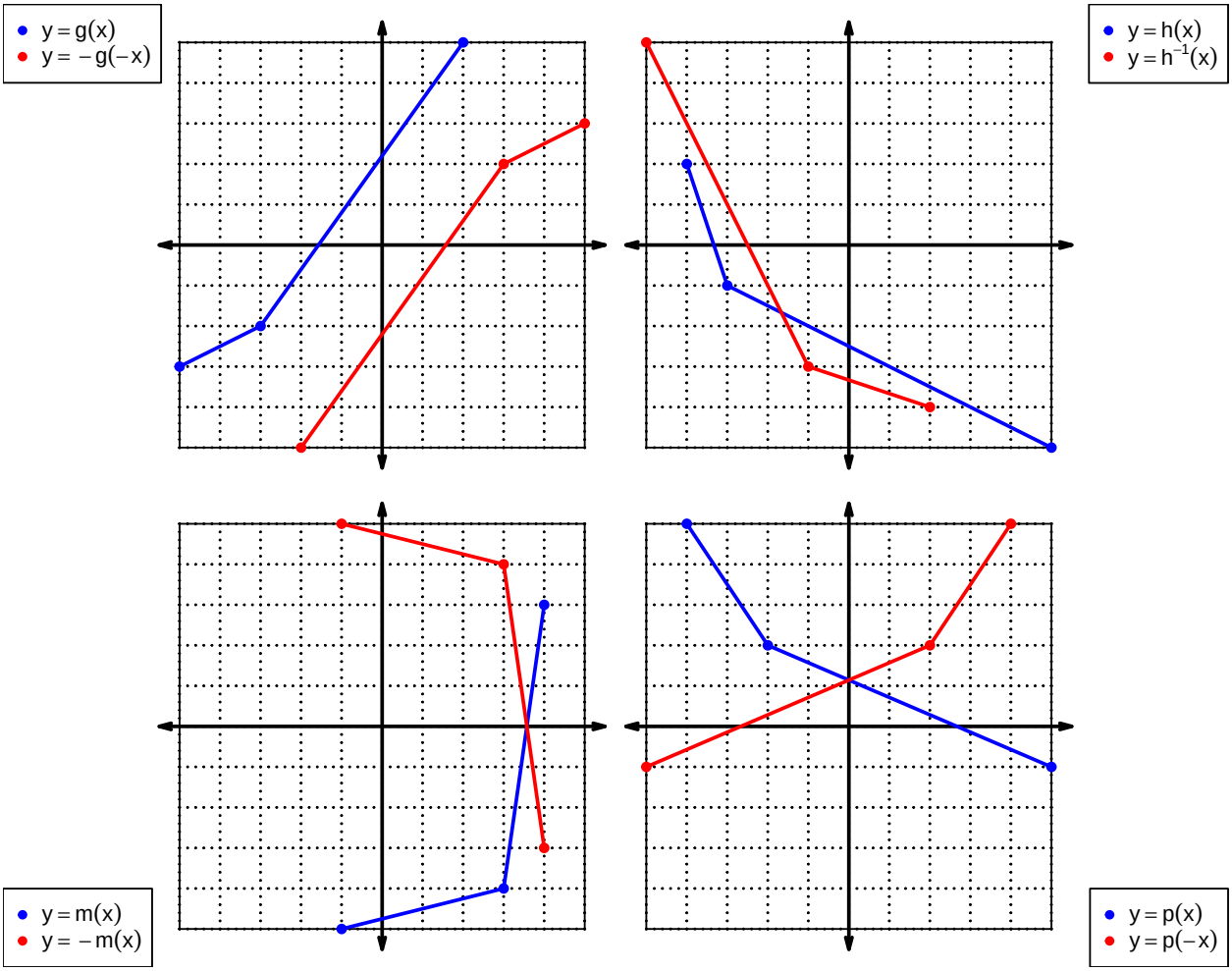
1. (worth 9 points) Let function f be defined by the polynomial below:

$$f(x) = -2x^5 + 7x^4 - 5x^3 + 3x^2 + 9x + 4$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$f(-x)$	$2x^5 + 7x^4 + 5x^3 + 3x^2 - 9x + 4$
$-f(-x)$	$-2x^5 - 7x^4 - 5x^3 - 3x^2 + 9x - 4$
$-f(x)$	$2x^5 - 7x^4 + 5x^3 - 3x^2 - 9x - 4$

2. (worth 20 points) In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	6	2	9
2	7	9	4
3	5	1	2
4	4	5	3
5	1	7	6
6	8	3	5
7	3	6	1
8	2	8	7
9	9	4	8

3. (worth 3 points) Evaluate $f(6)$.

$$f(6) = 8$$

4. (worth 3 points) Evaluate $g^{-1}(2)$.

$$g^{-1}(2) = 1$$

5. (worth 3 points) Assuming f is an **even** function, evaluate $f(-5)$.

If function f is even, then

$$f(-5) = 1$$

6. (worth 3 points) Assuming h is an **odd** function, evaluate $h(-9)$.

If function h is odd, then

$$h(-9) = -8$$

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7. (worth 15 points) A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
Let polynomial p be defined with the following equation:

$$p(x) \;=\; -x^3 + 1$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) \;=\; -(-x)^3 + 1$$
$$p(-x) \;=\; x^3 + 1$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) \;=\; -\left(x^3 + 1\right)$$
$$-p(-x) \;=\; -x^3 - 1$$

c. Is polynomial p even, odd, or neither?

neither

d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

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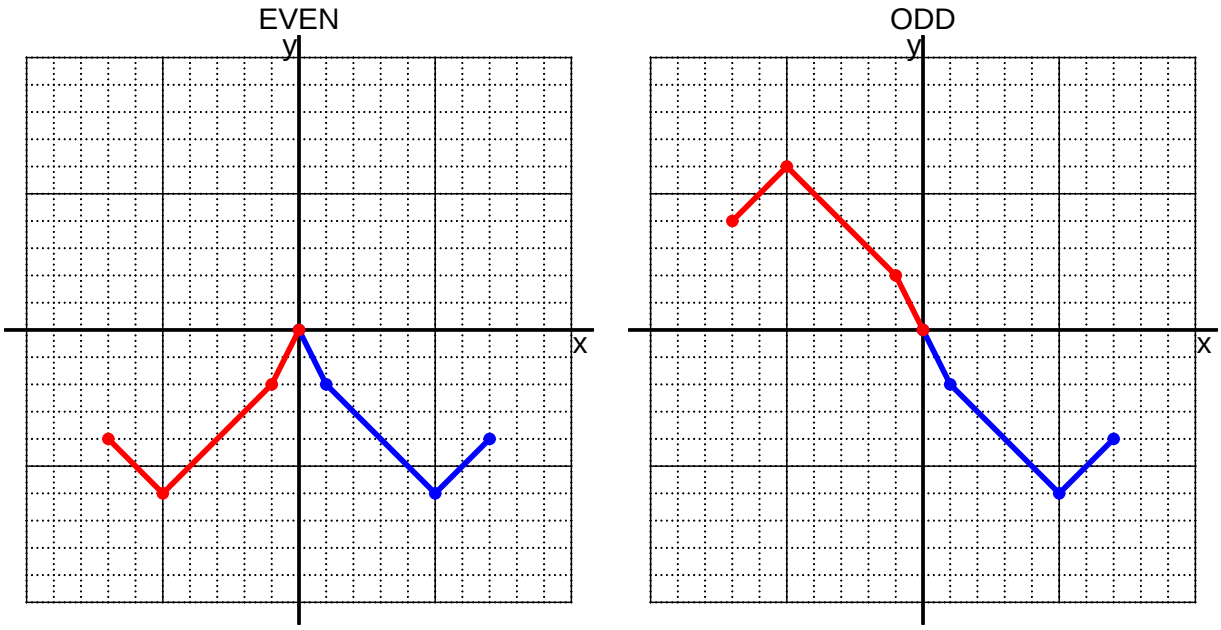
8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function f be defined with the equation below.

$$f(x) = \frac{x}{8} - 6$$

a. Evaluate $f(64)$.

step 1: divide by 8
step 2: subtract 6

$$f(64) = \frac{(64)}{8} - 6$$
$$f(64) = 2$$

b. Evaluate $f^{-1}(5)$.

step 1: add 6
step 2: multiply by 8

$$f^{-1}(x) = 8(x+6)$$
$$f^{-1}(5) = 8((5)+6)$$
$$f^{-1}(5) = 88$$

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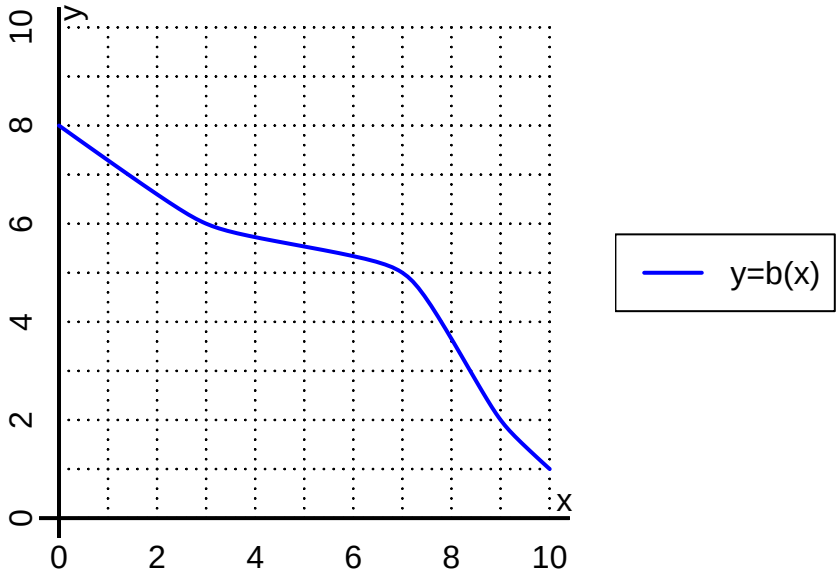
10. (worth 6 points) The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(9)$.

$b(9) = 2$

b. Evaluate $b^{-1}(5)$.

$b^{-1}(5) = 7$

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11. (worth 18 points) Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-7	7	-7	7
-1	9	-9	9	-9
0	0	0	0	0
1	9	-9	9	-9
2	-7	7	-7	7

b. Is function f even, odd, or neither?

even

c. How do you know the answer to part b?

Function f is even because column $f(-x)$ matches column $f(x)$ exactly.